UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,719	01/25/2006	Ashok M. Adur	1200309N US	7466

35227 7590 07/28/2008

POLYONE CORPORATION
33587 WALKER ROAD
AVON LAKE, OH 44012

EXAMINER	
LENIHAN, JEFFREY S	
ART UNIT	PAPER NUMBER
4171	
MAIL DATE	DELIVERY MODE
07/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,719	ADUR, ASHOK M.	
	Examiner	Art Unit	
	Jeffrey Lenihan	4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/07/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 4 and 11 depend from claims 3 and 8, respectively, and recite the limitation of a discontinuous phase dispersed "in the continuous thermoplastic elastomer phase". There is insufficient antecedent basis for this limitation in the claim. The examiner notes that while the total polymer composition is referred to as a thermoplastic elastomer, neither the instant claims, nor their respective parent claims, recite the limitation of a continuous thermoplastic elastomer phase. The instant claims each recite that the polymer composition comprises a continuous thermoplastic phase and a discontinuous elastomer phase.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ehata, JP 08-157659, published 6/18/1996 with additional evidence provided by “Modern Plastics Handbook,” edited by Charles A. Harper, and “Handbook of Thermoplastic Elastomers,” by Jiri George Drobny.

5. Claim 1 recites a molded article made from a composition comprising at least one thermoplastic elastomer having at least one elastomeric phase and one thermoplastic phase and a nucleating agent for the formation of nucleation sites for crystal growth within the thermoplastic phase of the thermoplastic elastomer. The at least one thermoplastic phase consists essentially of at least one propylene-based polymer and the at least one elastomer phase comprises a styrenic copolymer rubber phase or an at least partially cross-linked ethylene-propylene-diene rubber phase. Said nucleating agent comprises sodium benzoate, a sorbitol derivative, an organic phosphate ester salt, an acrylic acid-grafted polypropylene, nucleating talc, or combinations thereof. The molded article is recited to have been molded from the thermoplastic elastomer; the nucleating agent enhances the rate of crystal formation during cooling of the thermoplastic elastomer.

6. Ehata discloses a polymer composition comprising thermoplastic and elastomeric phases which are used to prepare sheets for the manufacturing of press through packaging such as blister packs for pharmaceuticals. Ehata discloses that the composition of JP 08-157659 contains 57-84 % by weight polypropylene homopolymer, and 10-25% by weight propylene-ethylene copolymer. Said propylene-ethylene copolymer has an ethylene content of 0.1-5% by weight (¶0006, 0008). These propylene-based polymers correspond to the thermoplastic phase of the polymer composition of the instant application. The elastomeric phase of the composition disclosed by Ehata comprises polymers chosen from the group comprising random and block styrene-butadiene copolymers, a styrene-isoprene copolymer, and ethylene-

propylene-diene ternary polymerization products (¶0009), corresponding to the polymers described as suitable elastomeric components for the polymer composition of the instant claim. The compositions of Ehata further comprise a nucleating agent, chosen from the group including derivatives of sorbitol (¶0007).

7. Ehata discloses that the polymer composition described in JP 08-157659 may be utilized to prepare sheets via the process of extrusion molding (¶0011). Ehata does not specifically teach that the addition of the nucleating agent results in an enhanced rate of crystal formation in the thermoplastic phase containing the nucleating agent as recited in the instant claim; however, the examiner takes the position that this inherently occurs. The examiner notes that it is well known in the art of polymer chemistry that nucleating agents act as sites for crystal formation within a polymer melt, thereby enhancing the rate of primary nucleation within the melt. As a result, the rate of crystallization of a polymer containing nucleating agents is increased compared to that exhibited by the same polymer without the nucleating agent, so that a solid crystal structure is formed in a shorter time. The addition of nucleating agents therefore is also known to reduce the set-up time of an article in the mold. The examiner refers the applicant to the attached sections of "Modern Plastics Handbook," edited by Charles A. Harper (page 4.54), and "Handbook of Thermoplastic Elastomers," by Jiri George Drobny (pages 14 and 15), for discussions of the affects of nucleating agents on polymer crystallization. As it is well known that nucleating agents increase the rate of crystallization and reduce the time needed for formation of solid structure, the examiner takes the position that the use of

nucleating agents in Ehata inherently teaches the recited limitations. Ehata therefore anticipates the instant claim.

8. Claims 2 and 9 depend from claims 1 and 8, respectively, and recite the limitation that the nucleating agent is dispersed within the at least one thermoplastic phase. Examples 1-6 of Ehata disclose polymer compositions comprising a thermoplastic phase prepared using a commercially available propylene homopolymer in which a nucleating agent is dispersed (¶0013, Table 1).

9. Claims 3 and 10 depend from claims 1 and 8, respectively, and recite the limitation that the thermoplastic phase comprises at least two chemically distinct thermoplastic phases. As noted previously, Ehata discloses polymer compositions containing both polypropylene homopolymers and propylene-ethylene copolymers (¶0006, 0008). The polymer compositions taught by Ehata further comprise a petroleum resin at a concentration of 1-8% by weight (¶0006, 0010). Ehata therefore anticipates the instant claims.

10. Claims 4 and 11 depend from claims 3 and 8, respectively, and recite the limitation that the thermoplastic phase comprises a continuous phase and the elastomer comprises a discontinuous phase dispersed in the continuous thermoplastic elastomer phase. Examples 1-6 of Ehata discloses polymer compositions thermoplastic and elastomeric components are combined with a nucleating agent and processed via extrusion (¶0012-0013). The examiner notes that the compositions in this example are primarily composed of the thermoplastic phase, comprising propylene homopolymers and copolymers. The styrenic copolymer which corresponds to the elastomeric phase

in the instant claims comprises either 5% or 10% by weight of the composition, while the nucleating agent is incorporated at a level of 0.3% by weight. Based on the ratios of the polymer components employed in preparing these compositions, one of ordinary skill would recognize that the blending of the thermoplastic and elastomeric components which occurs during the extrusion process would result in the dispersion of the elastomeric component within the thermoplastic phase, resulting in a dispersion of the styrenic copolymer within the continuous phase comprising the propylene polymers. Ehata therefore anticipates the invention of the instant claims.

11. Claims 5 and 12 depend from claims 4 and 8, respectively, and recite the limitation that the composition comprises about 0.005-5% by weight nucleating agent based on the total weight of the thermoplastic phase in the thermoplastic elastomer. Ehata discloses that the nucleating agent is used at a concentration of 0.002-0.3% by weight of the polymer composition (¶0007). Example 6 of Ehata, (see Table 1), discloses a polymer composition containing 0.3% by weight nucleating agent. The examiner notes that the polymer composition comprises primarily components of the thermoplastic phase, with the styrene copolymer corresponding to the elastomeric phase of the instant claim accounting for 5% of the total weight of the copolymer. The examiner notes, therefore, that the amount of nucleating agent present would correspond to slightly greater than 0.3% of the weight of the thermoplastic phase, anticipating the instant claims.

12. Claims 6 and 13 depend from claims 5 and 8, respectively, and recite the limitation that the thermoplastic elastomer comprises at least one thermoplastic phase

of polypropylene and wherein the thermoplastic elastomer comprises styrene-butadiene rubber, styrene-ethylene-butadiene rubber, styrene-isoprene-styrene rubber, etc. Hydrogenated versions of the elastomeric polymers or combinations thereof are also recited. As noted previously in this Office Action, the thermoplastic phase of the polymer composition taught by Ehata contains a propylene homopolymer (¶0006, 0008). Ehata further recites the use of styrene-butadiene block copolymer, styrene-isoprene copolymers, and hydrogenated versions of styrene-butadiene and styrene-isoprene copolymers as the elastomeric phase of the polymer compositions of JP 08-157659. Ehata therefore anticipates the instant claims.

13. Claims 7 and 14 depend from claims 6 and 8, respectively, and state that the article has enhanced transparency as compared to an article formed from a composition without the nucleating agent. Ehata discloses that the addition of the nucleating agent serves to improve the transparency of the polymer composition (¶0007). The examiner also notes that it is well known in the art that polymers containing nucleating agents have finer grain structure than unnucleated polymers, due to the fact that the presence of nucleating agents results in an increase in the number of nuclei from which crystallization occurs. The finer grain structure of nucleated polymers results in a reduction in the scattering of light as it passes through the material. Accordingly, nucleated polymers are known to be characterized by a greater transparency than unnucleated polymers (see Drobny, “Handbook of Thermoplastic Additives,” page 15 paragraphs 1 and 2 for additional information).

14. Claim 8 depends from claim 1 and recites a method of using a nucleating agent to enhance rate of formation of solid crystal structure in a thermoplastic elastomer being molded into an article, comprising the steps of adding a nucleating agent to the thermoplastic phase of a thermoplastic elastomer to form a thermoplastic elastomer composition referred to in claim 1, molding the composition into an article, and permitting the thermoplastic elastomer composition in the article to cool, wherein the nucleating agent stimulates formation of a solid crystal structure within the thermoplastic phase of the thermoplastic elastomer composition more rapidly than if the nucleating agent were not present.

15. As noted previously in this Office Action, Examples 1-6 of Ehata disclose polymer compositions prepared by dispersing an elastomeric phase comprising styrenic copolymers and a nucleating agent within a thermoplastic phase comprising propylene homo- and copolymers via extrusion (¶0012-0014), resulting in a composition corresponding to that recited in the instant claim 1. The compositions of Ehata are then processed by methods such as extrusion molding to form sheets that may be molded for the manufacturing of Blister packs for press-through packaging (¶0011, 0014-0016).

16. Ehata does not explicitly disclose that the rate of crystallization of the polymer composition containing the nucleating agent is greater than that of the same polymer without the nucleating agent; however, the examiner takes the position that this inherently occurs. As noted previously in this Office Action it is well known in the art of polymer chemistry that nucleating agents act as sites for crystal formation within a polymer melt, thereby enhancing the rate of crystallization of a polymer and reducing

the time required for a polymer to set-up in the mold. The examiner refers the applicant to the attached sections of "Modern Plastics Handbook," edited by Charles A. Harper (page 4.54), and "Handbook of Thermoplastic Elastomers," by Jiri George Drobny, for discussions of the affects of nucleating agents on polymer crystallization. As it is well known that nucleating agents increase the rate of crystallization and reduce the time needed for formation of solid structure, the examiner takes the position that the use of nucleating agents in Ehata inherently teaches the recited limitations. Ehata therefore anticipates the instant claims.

17. Claims 1-14 are rejected under 35 U.S.C. 102(b) as being unpatentable over Asuka, JP 2000095902 with additional evidence provided by "Modern Plastics Handbook," edited by Charles A. Harper, and "Handbook of Thermoplastic Elastomers," by Jiri George Drobny..

18. Regarding claim 1, Asuka recites a polymer composition comprising a propylene resin and a vinyl aromatic resin, corresponding to the thermoplastic and elastomeric phases of the polymer composition of the instant claim, respectively (¶0010). Examples of suitable vinyl aromatic resins are recited to be styrene-butadiene copolymers and styrene-isoprene copolymers (¶0013). Asuka further teaches the incorporation of a nucleating agent within the polymer composition (¶0010) and recites the use of dibenzylidenesorbitol as a suitable nucleating agent (¶0044), corresponding to the disclosure in the instant claim of sorbitol derivatives as suitable nucleating agents.

19. Asuka discloses that the polymer composition described in JP 2000095902 may be utilized to prepare films via processes such as extrusion molding. The polymer composition is prepared via a process of melt-mixing in a mixer, kneader or extruder as is known in the art. Extrusion may then be utilized to mold the polymer composition into a film (¶0048). Asuka further recites that the composition may be molded to produce containers for cosmetics, medical purposes, food, etc. (¶0071). Asuka does not specifically teach that the addition of the nucleating agent results in an enhanced rate of crystal formation in the thermoplastic phase containing the nucleating agent as recited in the instant claim; however, the examiner takes the position that this inherently occurs. As discussed in paragraph 7 of this Office Action, it is well known in the art of polymer chemistry that nucleating agents act as sites for crystal formation within a polymer melt, thereby enhancing the rate of crystallization of a polymer and reducing the set-up time of an article in a mold ("Modern Plastics Handbook," edited by Charles A. Harper, and "Handbook of Thermoplastic Elastomers," by Jiri George Drobny). The examiner therefore takes the position that the use of nucleating agents in Asuka inherently teaches the recited limitations regarding the rate of crystallization.

20. Regarding claims 2 and 9, the examiner notes that the polymer compositions described in Asuka primarily comprise the propylene resin (¶0010). Blending of the components to form the polymer composition via mixer or extruder (¶0048) will result in the dispersion of the recited nucleating agent within the propylene resin as described in the instant claims.

21. Regarding claims 3 and 10, Asuka discloses that the polymer compositions containing 100 parts by weight polypropylene resin and 0.3-0.5 parts by weight of spherical resin particles (¶0010). Such particles can comprise silicone resins, polyamides, etc (¶0019). It is the position of the examiner that the presence of such particles would constitute a thermoplastic phase comprising chemically distinct thermoplastic phases.

22. Regarding claims 4 and 11, the polymer compositions disclosed by Asuka are primarily composed of the propylene resin corresponding to the thermoplastic phase of the instant claims. Asuka teaches a polymer composition comprising 100 parts by weight of the propylene resin, whereas the vinyl aromatic resin corresponding to the elastomeric phase of the instant claim is incorporated into the composition at a level of 2-10 parts by weight (¶0010). Based on the ratios of the polymer components employed in preparing these compositions, one of ordinary skill would recognize that upon blending of the propylene and vinyl aromatic resins to form the polymer composition, the vinyl aromatic resin would become dispersed within the propylene resin. The resulting composition would comprise a discontinuous phase of vinyl aromatic polymer dispersed within the continuous phase of the propylene resin.

23. Regarding claims 5 and 12, Asuka discloses the addition of a nucleating agent to the polymer compositions of JP 2000095902. Said nucleating agent is incorporated into the polymer composition at a level of 0.005-0.1 parts by weight (¶0010). The examiner notes that, as the polymer composition primarily the propylene resin corresponding to the thermoplastic phase of the instant claims, the amount of nucleating agent present

would correspond to slightly greater than 0.005-0.1 parts by weight compared to the thermoplastic phase. Asuka further recites examples of polymer compositions containing 0.02 parts by weight dibenzylidenesorbitol as a nucleating agent (¶0063-0067, Table 2).

24. Regarding claims 6 and 13, as noted previously in this Office Action, the polymer composition taught by Asuka contains 100 parts by weight of a propylene resin (¶0010), corresponding to the thermoplastic phase of the instant claims. Asuka further recites the use of styrene-butadiene copolymers, styrene-isoprene copolymers, and hydrogenated versions of styrene-butadiene and styrene-isoprene copolymers as preferred embodiments of the vinyl aromatic compound corresponding to the elastomeric phase in the instant claims (¶0014).

25. Regarding claims 7 and 14, the examiner takes the position that the enhanced transparency of the polymer composition containing nucleating agents inherently occurs in the compositions disclosed by Asuka. As noted previously, Asuka teaches the addition of nucleating agents to polymer compositions corresponding to those described in the instant claims (¶0010, 0043, 0046). As noted in paragraph 13 of this Office Action, it is well known in the art that polymers containing nucleating agents have finer grain structure than unnucleated polymers, resulting in a reduction in the scattering of light as it passes through the material and a corresponding increase in the transparency of the material (see Drobny, “Handbook of Thermoplastic Additives,” page 15 paragraphs 1 and 2). The examiner therefore takes the position that the recited limitation of greater transparency is inherently taught by Asuka.

26. Regarding claim 8, Asuka, as noted previously in this Office Action, discloses polymer compositions prepared by dispersing vinyl aromatic resin and a nucleating agent within a propylene resin via extrusion (¶0048), resulting in a composition corresponding to that recited in the instant claim 1. The compositions of Asuka are then processed by methods such as extrusion to mold films (¶0048) corresponding to the molded article of the instant claim. Asuka does not disclose that the rate of crystallization of the polymer composition containing the nucleating agent is greater than that of the same polymer composition without the nucleating agent.

27. As noted previously in paragraph 7 of this Office Action, however, it is well known in the art of polymer chemistry that nucleating agents act as sites for crystal formation within a polymer melt, thereby enhancing the rate of crystallization of a polymer and reducing the time required for a polymer to set-up in the mold (see "Modern Plastics Handbook," edited by Charles A. Harper, and "Handbook of Thermoplastic Elastomers," by Jiri George Drobny). The examiner therefore takes the position that the use of nucleating agents in Asuka inherently teaches the recited limitations regarding rate of crystallization and formation of solid structure. Asuka therefore anticipates the instant claim.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Lenihan whose telephone number is (571)270-

5452. The examiner can normally be reached on Mon-Thurs: 7:30-5:00, every other Friday 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 4171

Jeffrey Lenihan
Examiner
Art Unit 4171

/JL/